BEMBIDION (AMERIZUS) OBLONGULUM MANNERHEIM IN NEW MEXICO (COLEOPTERA: CARABIDAE) WITH NOTES ON TRANSCONTINENTAL DISPERSAL IN PLEISTOCENE TIME.

By George E. Ball[1]

A NEW RECORD. Specimens of this species were collected by me in two localities in the Sangre de Cristo Mountains (the Las Vegas Range of Fall and Cockerell, 1907:148), San Miguel County, New Mexico: two males, Mosimann Ranch, 15.7 mi. west of Sapello, N. M. Route 266, June 20, 1963; one female, Holy Ghost Canyon, 14 mi. north of Pecos, N. M. Route 63, June 24, 1959. The former locality is in the "Beulah District" (Fall and Cockerell, 1907:145), and its position is shown on the Santa Fe, New Mexico sheet (U. S. Geological Survey, NI 13-2). The collections were made at an elevation of about 8,200 feet, in damp litter, in Canadian Zone forest consisting of aspen, alder, Douglas Fir, Engelmann and Colorado Blue Spruce. Adults of *oblongulum* were not found in August, although I searched for them. The presence of adults early in the summer and their absence later suggests that this species, like the similar eastern *Bembidion wingatei* Bland, is an imaginal hibernator (Lindroth, 1955:77).

Previously, *oblongulum* was known only from the Pacific Northwest (Lindroth, 1963:404). Probably it occurs throughout the Rocky Mountains at high elevations, from Idaho southward, but has not been collected in this area because individuals are small and inconspicuous, and not readily found because of the habitat, and because adults are not present at the height of the collecting season.

INTRASPECIFIC COMPARISONS. I have compared the New Mexico specimens with five specimens of *oblongulum* collected at Telegraph Point, near Kwinitsa, British Columbia. The eyes of the New Mexico specimens are slightly flatter. The two groups also differ in total length:[2] New Mexico males, 4.52-4.88 mm., females, 4.80 mm.; British Columbia males, 4.18-4.25 mm., females, 4.18-4.32 mm. This difference is not surprising in view of the small size of the samples, and considerable difference in latitude between the two areas.

INTERSPECIFIC COMPARISONS. The species *oblongulum* and the species *wingatei* are very similar to one another, and Lindroth (1963:406) suggested that the two might be geographically isolated subspecies of a single species (*wingatei* ranges from Newfoundland to northern Michigan and south in the mountains, to North Carolina). The New Mexico record extends the range of *oblongulum* about 400 miles eastward, and hence closer to *wingatei*. Therefore, it is worth comparing the New Mexico

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[1] Department of Entomology, University of Alberta, Edmonton, Alberta, Canada.

[2] Total length is the sum of three measurements: distance from base of mandible to posterior margin of compound eye; distance from anterior to posterior margin of pronotum, along mid-line; and distance from basal transverse line to apex, of longest elytron.

specimens with representatives of *wingatei* to see if the former are morphologically as well as geographically intermediate between the two nominal species.

The New Mexico specimens are like *wingatei* in form of the eyes, but differ in form of the pronotum and of the median lobe of the male. They are also larger in size. These specimens are more like *wingatei* than are the western specimens of *oblongulum,* but the New Mexico group cannot be regarded as an intergrading population. Therefore, I continue to regard the eastern and western segregates of this complex as distinct species.

ZOOGEOGRAPHICAL CONSIDERATIONS. The greater number of species of *Amerizus* in the west and the presence there of the related subgenus *Lionepha* Casey suggests that *Amerizus* is of western origin. The marked similarities between *oblongulum* and *wingatei* suggests that these two species are closely related, that is, they shared a relatively recent common ancestry. Of the two, *wingatei* seems to be the more derivative. Further, both forms are relatively cold-adapted, for they occur either in cool sheltered situations in lowlands, or else at high elevations. (For example, Carl H. Lindroth and I collected specimens of *oblongulum* in northern British Columbia, on a mountainside, at an elevation of about 2,000 feet, in an area just recently cleared of snow, and close to a snow patch. Even though the ground and air were cool, the beetles were very active.)

These facts suggest that the common ancestor of *oblongulum* and *wingatei* originated in the west, and could have spread eastward across the continent during a glacial period, in the boreal forest south of the ice. As warming occurred in an interglacial period, the ancestral species survived in cooler and damper areas. In the mountainous east and west, the species was able to spread southward at high elevations, but in the central part of the continent, the populations had to spread northward, as the ice melted, to find suitable habitats. Clinal differentiation may have taken place, so that the geographically extreme populations became quite different from one another. A later glaciation may have eliminated the populations in the central part of the continent. With the retreat of the ice, the surviving populations in the east and west moved northward, repopulating part, but not all, of the terrain that had been ice-covered, and giving rise to the present disjunct distribution.

This hypothesis requires a minimum of two glacial periods to produce the distribution pattern of the *oblongulum-wingatei* stock. Assuming that only two glacial periods were involved, and that they were the last two (Iowan and Wisconsin—Karlstrom, 1961), the entire process, from spreading to differentiation and partial extinction, required a time span of about 70,000 years.

A number of species or species pairs of northern carabids show a distribution pattern similar to the one described above, and the development of these patterns can be explained in the same way.

For a more detailed account of range change of an insect group during and since the Pleistocene, see Ricker (1964). See especially page 67 for a consideration of east-west disjuncts.

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LITERATURE NOTICE

BIOGEOGRAPHY OF THE SOUTHERN END OF THE WORLD. By P. J. Darlington, Jr. Harvard University Press, Cambridge, Mass. vii, 236 pp., illus. 1965.—The southern tip of South America, Tasmania with the southeastern corner of Australia, and New Zealand share many special groups of plants and animals in spite of the fact that these places are now separated by wide ocean gaps. Darlington describes these distributions and tries to explain them on evidence from climates past and present, geological history, paleontology, modes of dispersal, and ecology. As with his previous book, Darlington's unusually lucid and candid style of writing makes the usually difficult subject of biogeography rather understandable.

A NEW GENUS OF AUSTRALIAN CLAVICORN COLEOPTERA, PROBABLY OF A NEW FAMILY. By R. A. Crowson. Proc. Linn. Soc. New South Wales 89(2):241-245, 17 figs. 1964.—The larva and adult of *Cavognatha pullivora*, n.g., n.sp., are fully described and illustrated. Larvae were collected from nestlings of a bird and were reared to adulthood. The adults go to couplet 12 in Crowson's 1955 key to clavicorn families, but they can not be placed in either the Cucujidae or Silvanidae. The most distinctive feature of this beetle is on the mandibles; the lateral surface is deeply channeled and has an opening by a narrow passage into a large ovate internal cavity. Crowson suggests that the cavity might harbor bacterial spores as do the mandibular cavities of some sphindids.

NOTICE

In 1965 the Journal of Stored Products Research began. It is a quarterly dealing with the biology, ecology, physiology, behaviour, genetics, or control of stored products organisms. The editors are at the Pest Infestation Laboratory, Slough, England, a first-class organization in the study of stored products pests; their advisory board is international. Most articles in the first issue concern beetles, and we can probably look forward to many more like articles because most of such pests are beetles. Annual subscription rates are £10 or $30.00 for libraries, government departments, industrial establishments, etc., and £5 or $15.00 for individuals. The publisher is Pergamon Press, Headington Hill Hall, Oxford, England, or 44-01 21st Street, Long Island City, N. Y. 11101, U. S. A.